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PCT-5

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FORM PTO-1390 (REV 10-2000) U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371

ATTORNEY'S DOCKET NUMBER	
P-1660-US	
U.S. APPLICATION NO. (If known, see 37 CFR 1.5)	
09/674639	
INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE
PCT/IL99/00235	5 May 1999
PRIORITY DATE CLAIMED	
5 May 1998	

TITLE OF INVENTION: **SYSTEM AND METHOD FOR PROVIDING ACCESS TO VALUE ADDED SERVICES FOR ROAMIN(USERS OF MOBILE TELEPHONES**

APPLICANT(S) FOR DO/EO/US: **SOFER, Carmel; WOLFMAN, Shlomo;**

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
   a. ☒ is transmitted herewith (required only if not transmitted by the International Bureau).
   b. ☐ has been transmitted by the International Bureau.
   c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☐ A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3)).
   a. ☒ are transmitted herewith (required only if not transmitted by the International Bureau).
   b. ☐ have been transmitted by the International Bureau.
   c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
   d. ☐ have not been made and will not be made.
8. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11. to 16. below concern document(s) or information included:

11. ☐ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ☒ A FIRST preliminary amendment.
    ☐ A SECOND or SUBSEQUENT preliminary amendment.
14. ☐ A substitute specification.
15. ☐ A change of power of attorney and/or address letter.
16. ☒ Other items or information: 1) Postcard
    2)
    3)

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U.S. APPLICATION NO. (If known, see 37 CFR 1.5)	INTERNATIONAL APPLICATION NO.	ATTORNEY'S DOCKET NUMBER
09/674639	PCT/IL99/00235	P-1660-US

17. ☒ The following fees are submitted:

	CALCULATIONS PTO USE ONLY	
BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5):		
Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO $1000.00		
International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO $860.00		
International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO $710.00		
International preliminary examination fee paid to USPTO (37 CFR 1.482) but all claims did not satisfy provisions of PCT Article 33(1)-(4) $690.00		
International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(1)-(4) $100.00		
ENTER APPROPRIATE BASIC FEE AMOUNT =	$ 690.00	
Surcharge of $130.00 for furnishing the oath or declaration later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492(e)).	$	

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE		
Total claims	30 - 20 =	10	X $18.00	$ 180.00	
Independent claims	2 - 3 =	0	X $80.00	$	
MULTIPLE DEPENDENT CLAIM(S) (if applicable)			+ $270.00		
TOTAL OF ABOVE CALCULATIONS =				$ 870.00	
Reduction of 1/2 for filing by small entity, if applicable. A Small Entity Statement must also be filed (Note 37 CFR 1.9, 1.27, 1.28).				$	
SUBTOTAL =				$ 870.00	
Processing fee of $130.00 for furnishing the English translation later than ☐20 ☐30 months from the earliest claimed priority date (37 CFR 1.492(f)). +				$	
TOTAL NATIONAL FEE =				$	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). $40.00 per property +				$	
TOTAL FEES ENCLOSED =				$ 870.00	
				Amount to be refunded:	$
				charged:	$ 870.00

a. ☐ A check in the amount of $ _____ to cover the above fees is enclosed.

b. ☒ Please charge my Deposit Account No. 05-0649_in the amount of $870.00 to cover the above fees. A duplicate copy of this sheet is enclosed.

c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 05-0649_. A duplicate copy of this sheet is enclosed.

Note: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

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NAME

44,490
REGISTRATION NUMBER

09/674639
526 Rec'd PCT/PTO 02 NOV 2000

S/N:

PATENT
P-1660-US

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	C. SOFER et al	Examiner:	To be assigned
Serial No.:	To be assigned	Group Art Unit:	To be assigned
Filed:	Herewith		
Title:	SYSTEM AND METHOD FOR PROVIDING ACCESS TO VALUE ADDED SERVICES FOR ROAMING USERS OF MOBILE TELEPHONES		

PRELIMINARY AMENDMENT

Assistant Commissioner for Patents
Washington, DC 20231

Sir:

Please amend the Patent application before examination, as follows:

In the Specification:

At page 13, line 9, delete "200" and replace it with --400--.

At page 13, line 11, delete "202" and replace it with --402--.

At page 13, line 14, delete "204" and replace it with --404--.

At page 13, line 15, delete "206" and replace it with --406--.

At page 13, line 16, delete "208" and replace it with --408--.

At page 13, line 18, delete "210" and replace it with --410--.

At page 13, line 20, delete "212" and replace it with --412--.

At page 13, line 21, delete "214" and replace it with --414--.

In the Drawings:

Please amend Figs. 5A, 5B, 6 and 8B as indicated in red ink.

In the Claims:

Please charge any fees associated with this paper to deposit Account No. 05-0649.

Amend claims 15, 16, 29 and 30 as below:

In claim 8, line 2 of the claim, before "concurrently", add --substantially--.

In claim 15, line 1 of the claim, delete "any of claims 1 - 14" and replace it with --claim 1--.

In claim 16, line 1 of the claim, delete "any of claims 1 - 14" and replace it with --claim 1--.

In claim 23, line 4 of the claim, before "concurrently", add --substantially--.

In claim 29, line 1 of the claim, delete "any of claims 17- 28" and replace it with --claim 17--.

In claim 30, line 1 of the claim, delete "any of claims 17 - 28" and replace it with --claim 17--.

REMARKS

Amendments to the Specification

The amendments to the Specification are editorial in nature.

Amendments to the Drawings

The amendments to Figs 5A, 5B, 6 and 8B have been made to match to text in the Specification.

Amendments to the Claims

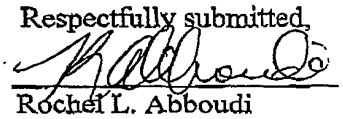
The amendments to Claims 15, 16, 29 and 30 cancel multiple dependency.

Claims 8 and 23 have been voluntarily amended to broaden the scope of the claimed invention.

No new material has been added. Admission of the foregoing amendments is respectfully requested.

Should the Examiner have any question or comment as to the form, content, or entry of this Paper, the Examiner is requested to contact the undersigned at the telephone number below. Similarly, if there are any further issues yet to be resolved to advance the prosecution of this Application to issue, the Examiner is requested to telephone the undersigned counsel.

Respectfully submitted,



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Registration No. 44,490

Date: 2 November, 2000

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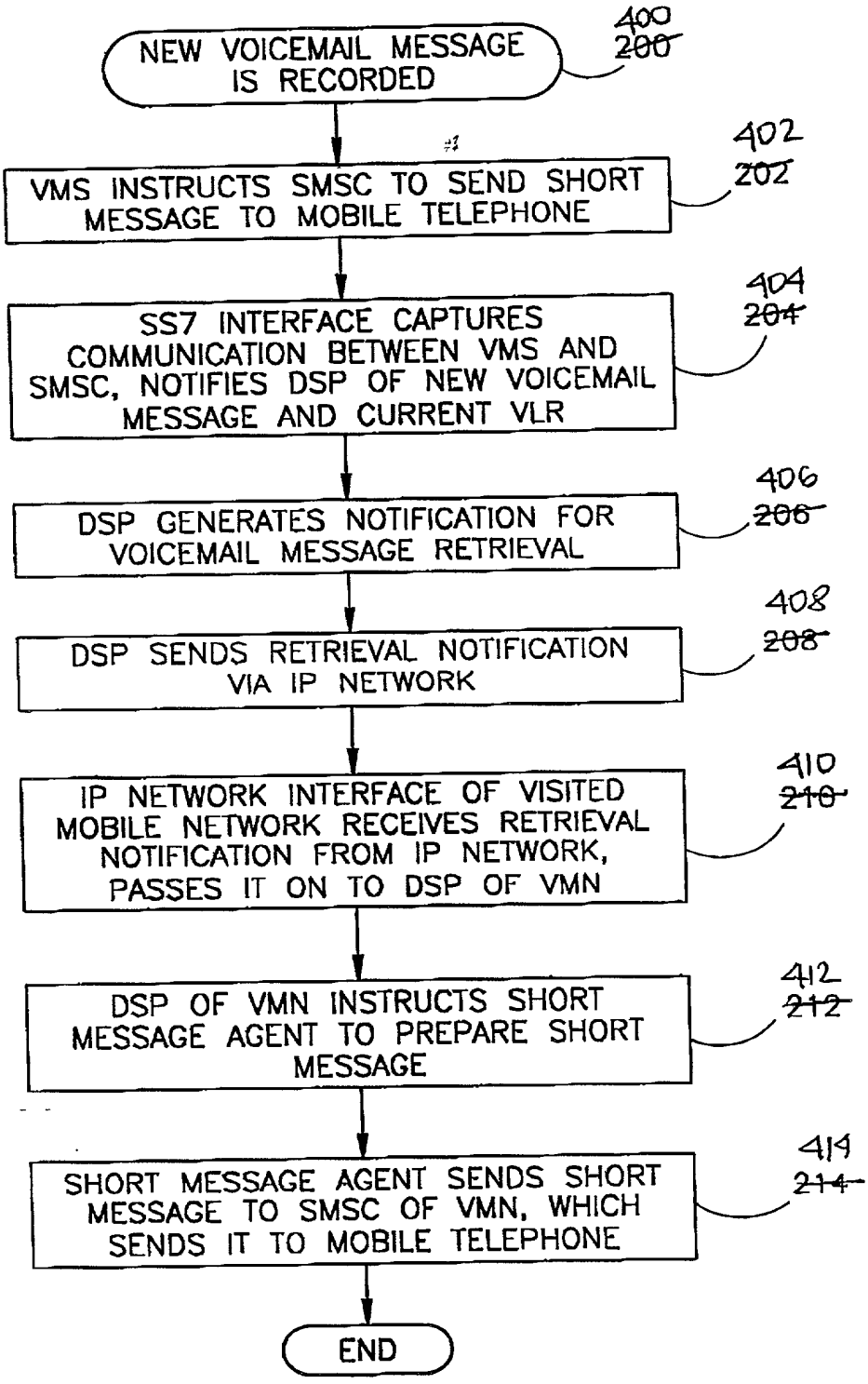
NEW VOICEMAIL MESSAGE IS RECORDED
400
200
VMS INSTRUCTS SMSC TO SEND SHORT MESSAGE TO MOBILE TELEPHONE
402
202
SS7 INTERFACE CAPTURES COMMUNICATION BETWEEN VMS AND SMSC, NOTIFIES DSP OF NEW VOICEMAIL MESSAGE AND CURRENT VLR
404
204
DSP GENERATES NOTIFICATION FOR VOICEMAIL MESSAGE RETRIEVAL
406
206
DSP SENDS RETRIEVAL NOTIFICATION VIA IP NETWORK
408
208
IP NETWORK INTERFACE OF VISITED MOBILE NETWORK RECEIVES RETRIEVAL NOTIFICATION FROM IP NETWORK, PASSES IT ON TO DSP OF VMN
410
210
DSP OF VMN INSTRUCTS SHORT MESSAGE AGENT TO PREPARE SHORT MESSAGE
412
212
SHORT MESSAGE AGENT SENDS SHORT MESSAGE TO SMSC OF VMN, WHICH SENDS IT TO MOBILE TELEPHONE
414
214
END

FIG.6

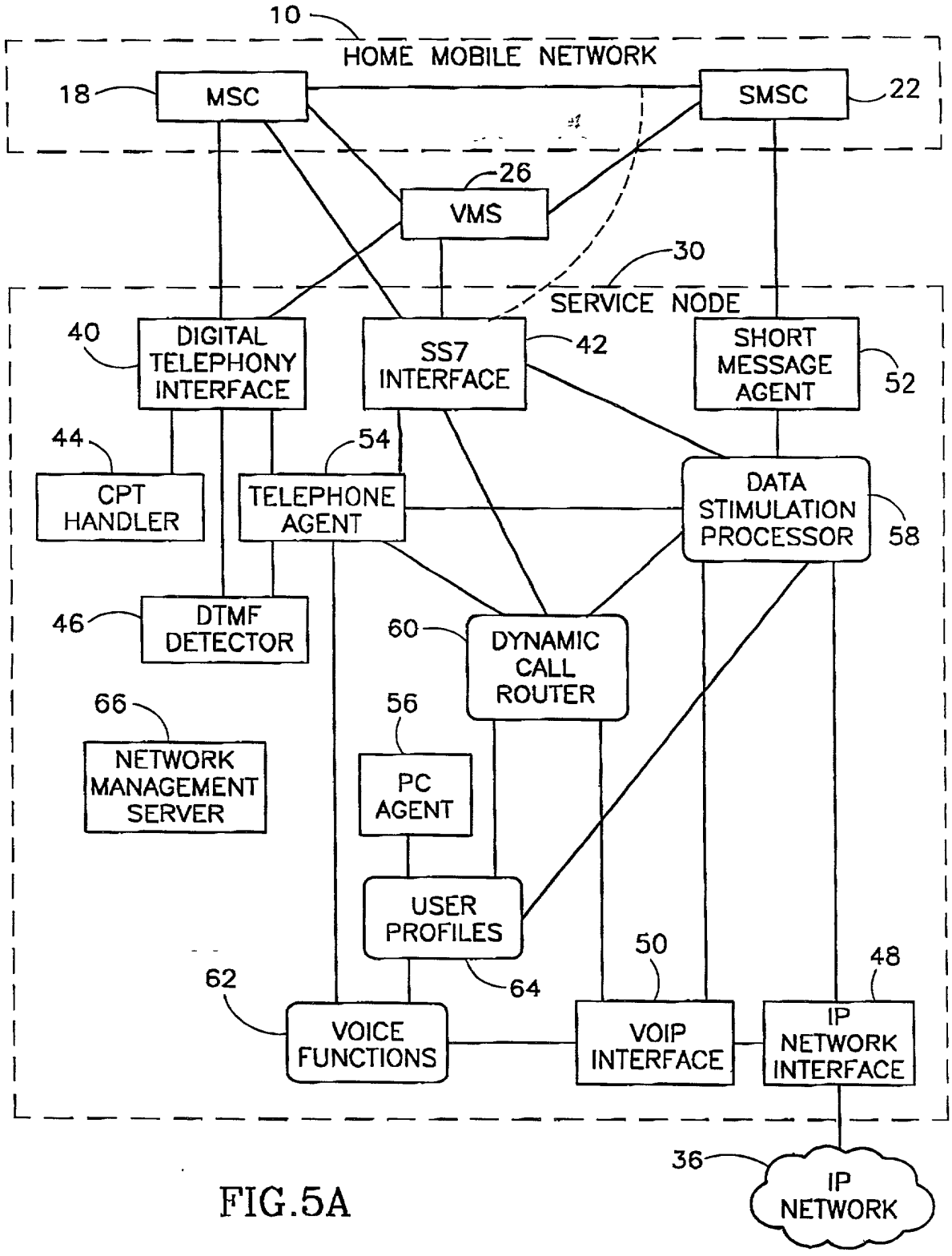
10
HOME MOBILE NETWORK
18
MSC
SMSC
22
26
VMS
30
SERVICE NODE
40
DIGITAL TELEPHONY INTERFACE
SS7 INTERFACE
42
SHORT MESSAGE AGENT
52
44
CPT HANDLER
54
TELEPHONE AGENT
DATA STIMULATION PROCESSOR
58
46
DTMF DETECTOR
60
DYNAMIC CALL ROUTER
66
NETWORK MANAGEMENT SERVER
56
PC AGENT
USER PROFILES
62
64
50
48
VOICE FUNCTIONS
VOIP INTERFACE
IP NETWORK INTERFACE
36
IP NETWORK

FIG.5A

09/674639

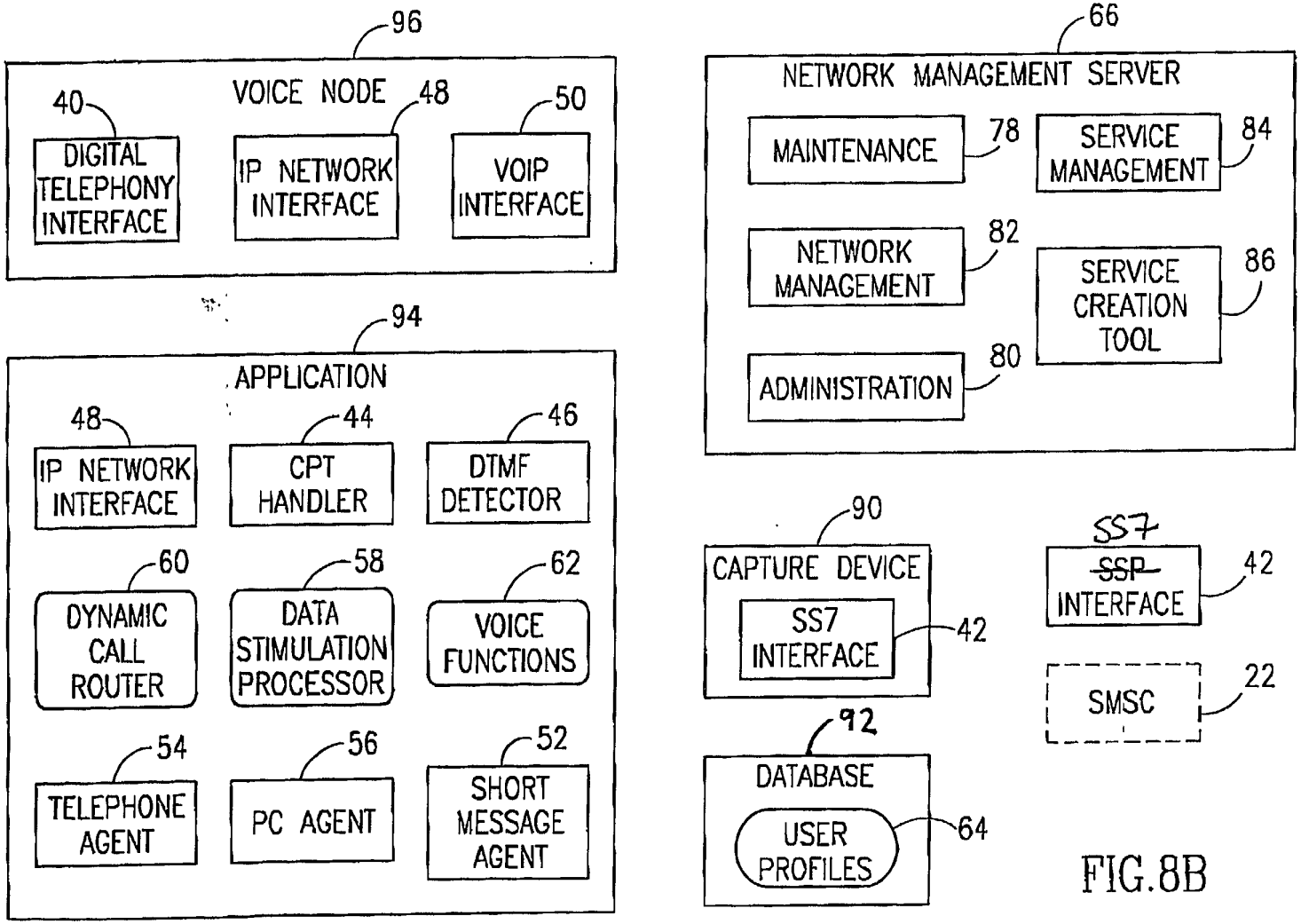

FIG.8B

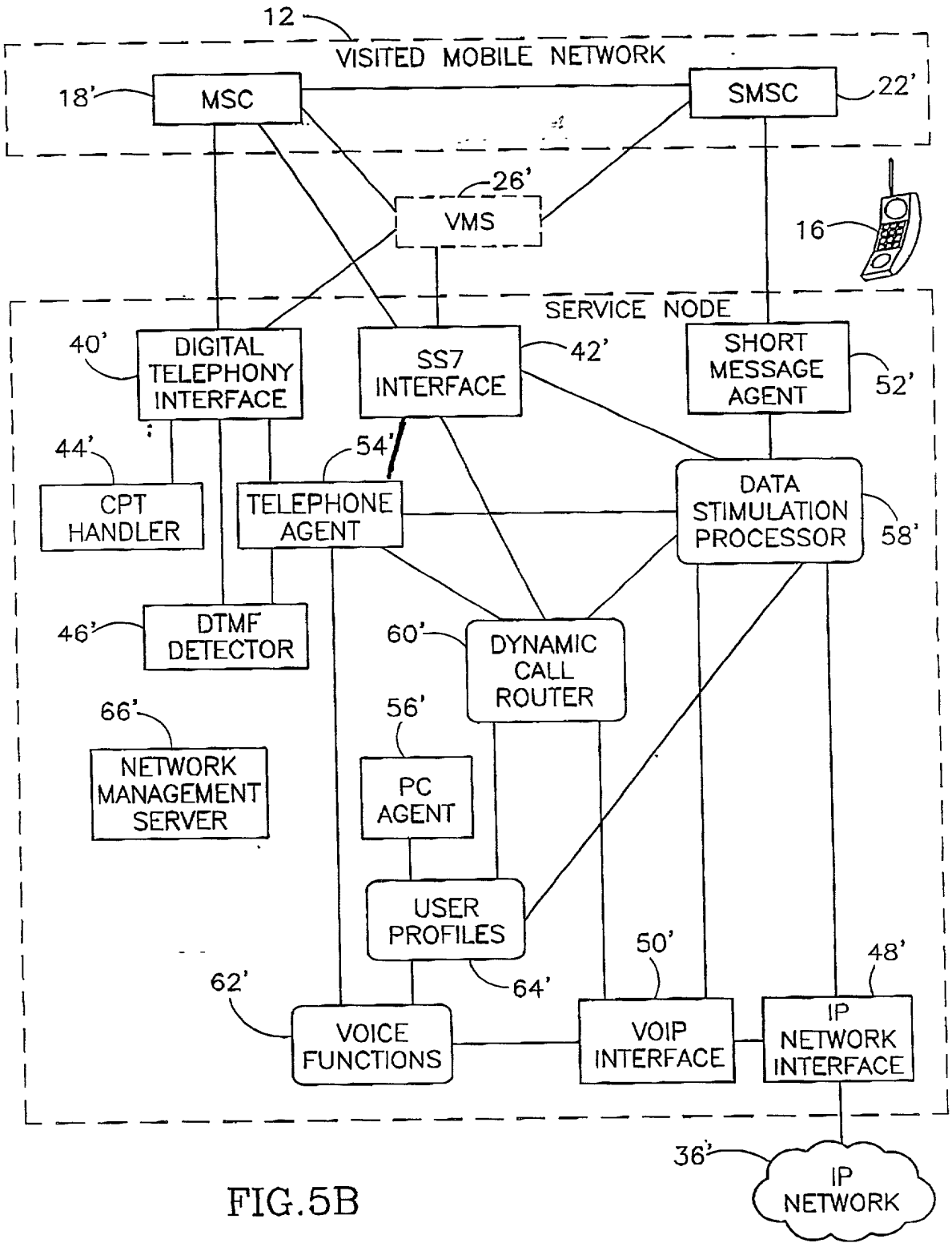
12
VISITED MOBILE NETWORK
18'
MSC
SMSC
22'
26'
VMS
16
SERVICE NODE
40'
DIGITAL TELEPHONY INTERFACE
SS7 INTERFACE
42'
SHORT MESSAGE AGENT
52'
44'
54'
CPT HANDLER
TELEPHONE AGENT
DATA STIMULATION PROCESSOR
58'
46'
DTMF DETECTOR
60'
DYNAMIC CALL ROUTER
66'
56'
NETWORK MANAGEMENT SERVER
PC AGENT
USER PROFILES
50'
48'
62'
64'
VOICE FUNCTIONS
VOIP INTERFACE
IP NETWORK INTERFACE
36'
IP NETWORK

FIG.5B

10 PRTS

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SYSTEM AND METHOD FOR PROVIDING ACCESS TO VALUE ADDED SERVICES FOR ROAMING USERS OF MOBILE TELEPHONES

FIELD OF THE INVENTION

The present invention relates to communication systems in general and to value added services such as voice mail in particular.

BACKGROUND OF THE INVENTION.

Mobile telephone operators around the world have built an international "network of networks". A subscriber to a particular mobile network can receive calls when roaming in a visited mobile network. This is shown in Fig. 1, to which reference is now made, which is schematic illustration of a prior art communication system which enables roaming. The communication system comprises a home mobile network (HMN) 10 and a visited mobile network (VMN) 12 connected by a telephone infrastructure 14. A mobile telephone 16 belonging to a user that has subscribed to the HMN 10 is roaming in the VMN 12. The HMN 10 comprises a mobile switch center (MSC) 18, a home location register (HLR) 20 and a short message service center (SMSC) 22. Similarly, the VMN 12 comprises an MSC 18′, a visited location register (VLR) 24 and an SMSC 22′. The HMN 10 is connected to a voice mail system (VMS) 26.

When the mobile telephone 16 is turned on in the VMN 12, the mobile telephone 16 registers itself in the VLR 24, which notifies the HLR 20 via the telephone infrastructure 14 that the mobile telephone 16 is accessible via the MSC 18′. When the HMN 10 receives a call for the mobile telephone 16, its MSC 18 interrogates the HLR 20 and transfers the call over the telephone infrastructure 14 to the MSC 18′ of the VMN 12, which transfers the call to the mobile telephone 16.

If the mobile telephone 16 is turned off or busy, the incoming call to the MSC 18 is forwarded to the VMS 26, where a message may be recorded. In the event of a message recorded in the voice mailbox of the VMS 26 for the mobile telephone 16, the VMS 26 sends a standard notification to the SMSC 22. There are a number of problems with notifying the roaming mobile telephone 16 that a

message has been recorded in the VMS 26 and with enabling the mobile telephone 16 to retrieve the message.

One problem is that the notification is not always transferred successfully to the VMN 12. For example, if the HMN 10 and VMN 12 are not both Global System for Mobile communication (GSM) networks, then it may not be technically possible to transfer the notification. As a further example, the telephone infrastructure 14 may block notifications for technical or commercial reasons.

Another problem is that even if the mobile telephone 16 receives the notification, the short code that the user of the mobile telephone 16 dials in order to access the voice mailbox while in the HMN 10 is generally irrelevant in the VMN 12. For example, if the user accesses the voice mailbox directly by dialing "634" while in the HMN 10, dialing "634" while in the VMN 12 does not enable the user to access the voice mailbox. Therefore, the user must call the HMN 10 using a full international number (14 digits when calling direct, 35 digits when using "call back" services). The user then has to dial the voice mailbox number and password (an additional 4 to 10 digits). It is unlikely that the user will complete this complex long dialing procedure correctly. It is also unlikely that the user will try again after failing the first time. Another contributing factor to the failure of the long dialing procedure is that dial tone multi-frequency (DTMF) signals are transmitted with low quality over international telephone lines. In principle, it is possible to eliminate the dialing of the voice mailbox number and password by using the calling line identification (CLI) of the mobile telephone 16 to identify which voice mailbox to use, but the CLI is also not always transmitted successfully over international telephone lines.

Even when the roaming user succeeds in accessing the voice mailbox and retrieving the message, the user pays expensive international telephone rates. For this reason, most roaming users do not retrieve their voice mail messages, and many corporations even instruct their employees not to retrieve voice mail messages while roaming. This leads to a loss of service to the users and to a loss of income to the mobile network operators.

US Patent 5,751,792 to Chau et al. describes a system and method for providing a message system subscriber with a roaming mailbox. The messages in the home mailbox are transferred to a temporary roaming mailbox at a roaming

node. According to Chau, the visited mobile network (VMN) must either have a dedicated voice mail system (VMS) for roaming users or must allocate temporary mailboxes in the existing VMS of the VMN. There may not be room available in the existing VMS for allocation of temporary mailboxes. It is not clear when to delete an allocated temporary mailbox. Furthermore, mailboxes cost the VMN money and it may be complicated for the VMN to be reimbursed for this cost. The user will have to contend with an unfamiliar way to access and work with voice mail messages.

The European Telecommunications Standards Institute (ETSI) has set a new GMS standard called Customized Application of Mobile Enhanced Logic (CAMEL). The standard specifies all the components needed to let GSM network operators offer the Intelligent Network (IN) services they supply in their home country to customers that roam on foreign networks. A major disadvantage to CAMEL is that it requires an upgrade to the installed mobile network. This is an expensive and time-consuming procedure. Moreover, CAMEL-compatible components are not yet commercially available. Furthermore, non-GSM networks are not able to use CAMEL to offer IN services to roaming subscribers.

SUMMARY OF THE INVENTION

The present invention provides a novel system and method for providing access to value added services such as voice mail services for roaming users of mobile telephones that overcomes the disadvantages of the prior art.

There is provided, in accordance with a preferred embodiment of the present invention, a system for providing a roaming subscriber with access to services available in a first telephone network. The subscriber is roaming in a second telephone network. The system includes a packet-switch network connecting the first telephone network with the second telephone network, wherein signals required for the services are transmitted between the first telephone network and the second telephone network via the packet-switch network.

Moreover, in accordance with a preferred embodiment of the present invention, the first and second telephone networks are from a group including: a mobile telephone network, a fixed telephone network, a Global System for Mobile

communications (GSM) network, a Time Division Multiple Access (TDMA) network, a Code Division Multiple Access (CDMA) network, an IS-41 network, and a private branch exchange (PBX).

Furthermore, in accordance with a preferred embodiment of the present invention, the system further includes a passive System Signaling Number 7 (SS7) monitor for monitoring SS7 signals and triggering the provision of access to at least one of the services when one of a group of predetermined SS7 signals has been detected.

Moreover, in accordance with a preferred embodiment of the present invention, the predetermined SS7 signals are Mobile Application Part (MAP) messages.

Furthermore, in accordance with a preferred embodiment of the present invention, the messages are from a group including: short messages and location updates.

Moreover, in accordance with a preferred embodiment of the present invention, the system further includes a first service node for transmitting the signals between the first telephone network and the packet-switch network, and a second service node for transmitting the signals between the packet-switch network and the second telephone network.

Furthermore, in accordance with a preferred embodiment of the present invention, the second service node transmits dial tone multi-frequency (DTMF) signals concurrently with the creation of a voice path connecting the first telephone network with the second telephone network, and the first service node synchronizes the DTMF signals with the voice path.

Additionally, in accordance with a preferred embodiment of the present invention, the subscriber uses a short code dependent upon the location of the subscriber to access the second service node.

Moreover, in accordance with a preferred embodiment of the present invention, the first service node instructs the second service node via the packet-switch network to generate and send a short message.

Additionally, in accordance with a preferred embodiment of the present invention, the system further includes a user profile of the subscriber, the user

profile comprising at least a subscriber calling line identification (CLI), wherein the subscriber CLI is required for access to the services.

Moreover, in accordance with a preferred embodiment of the present invention, the second service node receives the subscriber CLI from DTMF signals sent by the subscriber.

Alternatively, in accordance with a preferred embodiment of the present invention, the second service node receives a second CLI from the second telephone network and the second CLI is associated with the subscriber CLI.

Moreover, in accordance with a preferred embodiment of the present invention, the second service node creates a voice path connecting the second telephone network with the first telephone network using a second CLI of the second service node, and the first service node replaces the second CLI with the subscriber CLI when accessing one of the services.

Furthermore, in accordance with a preferred embodiment of the present invention, the services include voice message notification.

Additionally, in accordance with a preferred embodiment of the present invention, the services include voice message retrieval.

There is also provided in accordance with a preferred embodiment of the present invention a method for providing a roaming subscriber with access to services available in a first telephone network. The method includes the steps of connecting the first telephone network to a second telephone network using a packet-switch network, and transmitting signals for the services over the packet-switch network. The subscriber is roaming in the second telephone network.

Moreover, in accordance with a preferred embodiment of the present invention, the first and second telephone networks are from a group including: a mobile telephone network, a fixed telephone network, a Global System for Mobile communications (GSM) network, a Time Division Multiple Access (TDMA) network, a Code Division Multiple Access (CDMA) network, an IS-41 network, and a private branch exchange (PBX).

Moreover, in accordance with a preferred embodiment of the present invention, the method further includes the steps of monitoring SS7 signals and

upon detection of one of a group of predetermined SS7 signals, triggering the provision of access to at least one of the services.

Furthermore, in accordance with a preferred embodiment of the present invention, the predetermined SS7 signals are Mobile Application Part (MAP) messages.

Additionally, in accordance with a preferred embodiment of the present invention, the messages are from a group including: short messages and location updates.

Moreover, in accordance with a preferred embodiment of the present invention, the method further includes the steps of transferring dial tone multi-frequency (DTMF) signals over the packet-switch network, and, concurrently with the step of transferring, creating a voice path connecting the first telephone network with the second telephone network. The method also includes the step of synchronizing the DTMF signals with the voice path.

Furthermore, in accordance with a preferred embodiment of the present invention, the method further includes the step of using a short code dependent upon the location of the subscriber to access one of the services.

Additionally, in accordance with a preferred embodiment of the present invention, the method further includes the step of accessing the services using a subscriber calling line identification (CLI) stored in a user profile of the subscriber.

Moreover, in accordance with a preferred embodiment of the present invention, the method further includes the step of receiving the subscriber CLI from DTMF signals sent by the subscriber.

Furthermore, in accordance with a preferred embodiment of the present invention, the method further includes the step of receiving a second CLI from the second telephone network, wherein the second CLI is associated with the subscriber CLI.

Additionally, in accordance with a preferred embodiment of the present invention, the method further includes the steps of creating a voice path connecting the second telephone network with the first telephone network using a second CLI, and replacing the second CLI with the subscriber CLI when accessing one of the services.

Moreover, in accordance with a preferred embodiment of the present invention, the services include voice message notification.

Furthermore, in accordance with a preferred embodiment of the present invention, the services include voice message retrieval.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will be understood and appreciated more fully from the following detailed description taken in conjunction with the appended drawings in which:

Fig. 1 is schematic illustration of a prior art communication system which enables roaming;

Fig. 2 is a schematic illustration of communication system according to a preferred embodiment of the present invention;

Fig. 3 is a schematic, high-level flowchart illustration of a method for voice mail notification, according to a preferred embodiment of the present invention;

Fig. 4 is a schematic, high-level flowchart illustration of a method for voice mail message retrieval, according to a preferred embodiment of the present invention;

Figs. 5A and 5B are schematic block diagram illustrations of service nodes, according to a preferred embodiment of the present invention;

Fig. 6 is a schematic flowchart illustration of a detailed method for voice mail notification, according to a preferred embodiment of the present invention;

Fig. 7 is a schematic flowchart illustration of a detailed method for voice mail message retrieval, according to a preferred embodiment of the present invention; and

Figs. 8A and 8B are schematic block diagram illustrations of service nodes, according to a preferred embodiment of the present invention.

DETAILED DESCRIPTION OF THE PRESENT INVENTION

The present invention provides a novel system and method for providing access to and enhancements of value added services to roaming users of telephones, by transferring certain signals over a packet-switch network through service nodes connected to the telephone networks. A non-limiting example of a packet-switch network is an Internet Protocol (IP) network. Non-limiting examples of the telephone networks connected by the packet-switch network are mobile telephone network, fixed telephone networks, Global System for Mobile communications (GSM) networks, Time Division Multiple Access (TDMA) networks, Code Division Multiple Access (CDMA) networks, IS-41 networks, and private branch exchanges. The term "roaming" is hereinbelow defined to include the case of a mobile telephone user accessing services of a private branch exchange, even when the mobile telephone user is located in the home mobile network and not exclusively in a visited mobile network.

Reference is now made to Fig. 2, which is a communication system according to a preferred embodiment of the present invention. The communication system comprises the home mobile network (HMN) 10 and the visited mobile network (VMN) 12 connected by the telephone infrastructure 14. The mobile telephone 16 belonging to a user that has subscribed to the HMN 10 is roaming in the VMN 12. The HMN 10 comprises the mobile switch center (MSC) 18 and the short message service center (SMSC) 22, both of which are connected to the voice mail system (VMS) 26. The HMN 10 and the VMS 26 are both connected to a service node 30. The VMN 12 comprises the MSC 18′ and the SMSC 22′. The VMN 12 is connected to a service node 30′. The service node 30 and the service node 30′ are both connected to a packet-switch network, such as an IP network 36. As will be described hereinbelow, the service nodes 30 and 30′ may include internal SMSCs 22 and 22′ respectively. The following discussion is equally applicable to network SMSCs and internal SMSCs.

According to another preferred embodiment of the present invention, the VMN 12 is connected to a VMS 26′, which is also connected to the service node 30′. The messages in the voice mailbox of the VMS 26 are transferred via the

service node 30, the IP network 36 and the service node 30′ to a temporary mailbox of the VMS 26′. The retrieval notification sent to the mobile telephone 16 includes a short code which when dialed gives the mobile telephone 16 access to the temporary mailbox.

In an alternative preferred embodiment, the communication system also comprises a corporate private branch exchange (PBX) 38 having a VMS 26″, both of which are connected to a service node 30″. The service node 30″ is also connected to the IP network 36.

When a new message is recorded in the voice mailbox of the VMS 26 for the mobile telephone 16, the VMS 26 instructs the SMSC 22 to send a standard short message (SM) notification to the mobile telephone 16. As explained hereinabove, due to technical and commercial considerations, the standard SM notification does not always arrive at the mobile telephone 16. The service node 30 captures the communication between the SMSC 22 and the MSC 18 using a capture device which is a passive System Signaling Number 7 (SS7) monitor. The service node 30 sends a message over the IP network 36 to the service node 30′ about the new voice mail message. The service node 30′ instructs the SMSC 22′ to generate a short message and send it to the mobile telephone 16. If the SMSC 22′ is inaccessible or too busy, then the service node 30′ uses its internal SMSC 22′. If that is not possible, then the service node 30 instructs the SMSC 22 to generate the short message and send it via the telephone infrastructure to the mobile telephone 16. The short message includes the short code that enables access in the VMN 12 to the service node 30′. Alternatively, if the user profile indicates that the user receives out-dial notifications, or if the service profile of the service node 30′ is such that it generally generates out-dial notifications, then the service node 30′ will generate an out-dial notification to the mobile telephone 16 with the above short code. The short message or out-dial notification is sent to the mobile telephone 16.

The notification method is shown in the schematic, high-level flowchart illustration of Fig. 3, to which reference is now made. In step 100, a new voice mail message is recorded. There are three branches to the notification method, one for short message notification, one for out-dial notification, and one for out-dial

notification from the corporate voice mail. If the VMS 26 uses short message notification, then the SMSC 22 interrogates the HLR 20 to get the roaming information (step 102). If the user is roaming, the SMSC 22 sends a short message to the VLR 24 (step 104) and waits for confirmation. If a positive confirmation arrives, then the service node 30 is triggered (step 106) by the capture device. In a large network with many sites and SMSCs, the capture device will monitor the gateway MSC (i.e. the MSC that connects the network to other networks) or the HLR 20. The message listened for depends upon the device listened to, but the extracted information is the same. The service node 30 sends a "dial short code" short message to the mobile telephone 16 (step 108) and the internal database of the service node 30 is updated (step 110).

If out-dial notification is used, the service node 30 gets the user ID (step 112) from the CLI of the incoming call from the VMS 26. The service node 30 then checks its internal database to see whether the user is roaming (step 114). If the internal database does not indicate that the user is roaming, then the service node 30 interrogates the HLR 20 in order to locate the user (step 116). If the HLR 20 indicates that the user is roaming, then the service node 30 sends a "dial short code" short message to the mobile telephone 16 (step 108) and the internal database of the service node 30 is updated (step 110).

In the case of a new voice mail message in the corporate VMS 26″, there is no need to check roaming, since notification is sent to the mobile telephone 16 whether or not the user is roaming. The information in the internal database is used to determine which service node sends the short message for the corporate user. The service node 30″ learns of the new message in the corporate VMS 26″ either by listening to the PBX out-dial notification or by some other integration method. If VLR 24 information is missing from the internal database of the service node 30, then the HLR 20 is queried for the current location of the mobile telephone 16.

It will be appreciated that the method of Fig. 3 does not necessarily involve sending a notification for each new voice mail message. The service profile or user profile may be configured to send a notification according to a different policy, for example, for each fifth new voice mail message.

Referring back to Fig. 2, in order to retrieve the messages from the voice mailbox, the user of the mobile telephone 16 dials the short code displayed in the short code notification, or presses "SEND". This is detected by the service node 30′ which transfers the signals such as the calling line identification (CLI) and the dial tone multi-frequency (DTMF) signals via the IP network 36. The voice connection to the HMN 10 is made either via the telephone infrastructure 14 or using voice over IP (VOIP) technology via the IP network 36. The service node 30 receives the transferred signals and uses them to route the call to the subscriber's voice mailbox. If there is not enough information, then the service node 30 connects to the common access of the VMS 26. DTMF signals dialed by the user to access the mailbox and perform services on the mailbox are transferred throughout the call via the IP network 36.

The voice mail message retrieval method is shown in the schematic, high-level flowchart illustration of Fig. 4, to which reference is now made. In step 200, the user dials the short code sent in the retrieval notification, or presses "SEND". If the CLI of the mobile telephone 16 is available, then the service node 30′ looks up the address of the HMN 10 based on the CLI of the mobile telephone (step 202). If the CLI of the mobile telephone is not available, the service node 30′ plays a voice prompt for the user to enter the subscriber CLI and Personal Identification Number (PIN) (step 204). The user dials the subscriber CLI and PIN and the service node 30′ determines the subscriber CLI and PIN from the DTMF signals (step 206). If the PIN is invalid, the voice mail message is not retrieved. If the PIN is valid, the service node 30′ looks up the address of the HMN 10 based on the subscriber CLI (step 202).

It will be appreciated that if the subscriber is roaming with a rented mobile telephone rather than with the mobile telephone that he uses in the HMN 10, then the CLI of the rented mobile telephone will differ from the subscriber CLI. However, the user profile of the subscriber in service node 30 associates the subscriber CLI with the CLI of the rented mobile telephone.

Once the service node 30′ knows the address of the HMN 10, it communicates with the HMN 10 via the service node 30 over the IP network 36, authenticating and authorizing the user of the mobile telephone 16 (step 210).

Then the service node 30′ routes the call from the mobile telephone 16 to the HMN 10 either via the telephone infrastructure 14 or using VOIP (step 212). It will be appreciated that this call is initiated with the CLI of the service node 30′ and not with the CLI of the mobile telephone. The service node 30′ sends the CLI of the mobile telephone over the IP network 36 to the service node 30. The service node 30 then uses the CLI of the mobile telephone to extract the subscriber CLI from the user profile and route the call to the VMS 26 using the subscriber CLI (step 214). The service node 30′ waits for user to hang up and then releases the voice path (step 216).

Corporate voice mail retrieval is accomplished by the same method, based on user information stored in the internal database of service node 30.

Reference is now made to Figs. 5A and 5B, which are schematic block diagram illustrations of the service nodes 30 and 30′, respectively, of Fig. 2, according to a preferred embodiment of the present invention. The service node 30 comprises a digital telephony interface (DTI) 40 and a System Signaling Number 7 (SS7) interface 42, both connected to the MSC 18 and the VMS 26. The service node 30 further comprises a CPT handler 44 and a DTMF detector 46, both connected to the DTI 40. The service node 30 also comprises an IP network interface 48 connected to the IP network 36, and a Voice Over Internet Protocol (VOIP) interface 50 connected to the IP network interface 48.

The service node 30 also comprises a short message agent 52 connected to the SMSC 22, a telephone agent 54 connected to the DTI 40, the SS7 interface 42 and the DTMF detector 46, and a personal computer (PC) agent 56.

The service node 30 further comprises a data stimulation processor (DSP) 58, a dynamic call router 60, a voice function unit 62, a user profile database 64, and a network management server 66. The DSP 58 is connected to the SS7 interface 42, the short message agent 52, the telephone agent 54, the VOIP interface 50 and the IP network interface 48. The dynamic call router 60 is connected to the DSP 58, the SS7 interface 42, the telephone agent 54 and the VOIP interface 50. The voice function unit 62 is connected to the telephone agent 54 and the VOIP interface 50. The user profile database 64 is connected to the

PC agent 56, the voice function unit 62, the dynamic call router 60 and the DSP 58.

The service node 30′ is identical to the service node 30 and its components have the same numbers as the components of the service node 30, with the addition of a tag (′) in order to differentiate between the service nodes 30 and 30′.

Reference is now made additionally to Fig. 6, which is a schematic flowchart illustration of the notification operation of the service nodes 30 and 30′. In step 200, a new voice mail message is recorded in the VMS 26. The VMS 26 instructs the SMSC 22 to send a short message to the mobile telephone 16 (step 202). The SS7 interface 42 captures the communication between the SMSC 22 and the MSC 18, and notifies the DSP 58 that a new voice mail message has been recorded and of the current roaming location of the mobile telephone 16 (step 204). The DSP 58 generates a notification for retrieval of the voice mail message (step 206) and sends it via the IP network interface 48 over the IP network 36 to the service node 30′ (step 208).

The IP network interface 48′ receives the retrieval notification from the IP network 36 and passes it on to the DSP 58′ (step 210). The DSP 58′ instructs the short message agent 52′ to prepare a short message based on the retrieval notification (step 212). The short message agent 52′ sends the short message to the SMSC 22′, which passes it on to the mobile telephone 16 (step 214).

At this point, the user has been notified that there is a new voice mail message and has been instructed how to retrieve it. The user may retrieve the message immediately upon receipt of the notification, or may retrieve the message later. Furthermore, the user may try to retrieve voice mail messages even without receiving a retrieval notification, by dialing the short code or pressing "SEND" for a saved short code message.

Reference is now made additionally to Fig. 7, which is a schematic flowchart illustration of the retrieval operation of the service nodes 30 and 30′. The user presses "SEND" in order to retrieve the voice mail message, thereby sending also the CLI via the SS7 interface 42′ (step 300). The DSP 58′ performs authentication and authorization of the CLI via the IP network 36 (step 302). This

involves sending the CLI via the IP network interface 48′ over the IP network 36 to the IP network interface 48 and to the DSP 58, which checks the user profiles database 64 for authentication and authorization. The DSP 58 then sends a confirmation back to the DSP 58′ over the IP network 36.

In the event that the CLI is not transmitted or successfully received, the service node 30′ opens an Interactive Voice Response (IVR) session with the user to ask for the CLI and PIN in order to authenticate, authorize and retrieve the user profile.

Once the CLI has been authenticated and the voice mail message retrieval authorized, the DSP 58′ instructs the telephone agent 54′ to pick up (step 304). The telephone agent 54′ instructs the DTI 40′ to pick up (step 306). Concurrently with steps 304 and 306, the DSP 58′ instructs the dynamic call router 60′ to contact the HMN 10 to create a voice path (step 308). The voice path may use the existing telephone infrastructure 14, in which case the dynamic call router 60′ contacts the HMN 10 via the telephone agent 54′, the DTI 40′ and the SS7 interface 42′, and the MSC 18′ and MSC 18. Alternatively, the voice path may use the IP network 36, in which case the dynamic call router 60′ contacts the HMN 10 via the VOIP interface 50′, the IP network interface 48′, the IP network interface 48, and the VOIP interface 50.

The request for voice contact arrives at the DSP 58 either via the DTI 40 or via the VOIP interface 50 (step 310). The DSP 58 extracts the CLI or mailbox address and password belonging to the mobile telephone 16 from the user profiles database 64 (step 312). Using the extracted information, the DSP 58 then contacts the VMS 26 via the telephone agent 54, thereby completing the voice path from the mobile telephone 16 to the VMS 26 (step 314).

The user listens to the voice mail messages over the voice path and performs additional voice mail functions such as reply, save, forward, etc. (step 316). The user operates these functions by dialing DTMF signals. According to a preferred embodiment of the present invention, the DTMF signals are captured by the service node 30′, transferred over the IP network 36, and regenerated by the service node 30. When the user hangs up, the voice path is released (step 318).

Reference is now made to Figs. 8A and 8B, which are two alternate schematic block diagram illustrations of a service node. Fig. 8A shows how the components of the service node 30 could be arranged in order to form a distributed service node connected by a local area network (LAN) 70, according to a preferred embodiment of the present invention. The service node 30 comprises a network messaging unit 72, a network agents unit 74, a network application server 76, and the network management server 66. The network management server 66 comprises a maintenance unit 78, an administration unit 80, a network management unit 82, a service management unit 84 and a service creation tool 86.

The maintenance unit 78 performs ongoing maintenance of the system and network, including monitoring, statistics, alarms reporting and handling, etc. Display and monitoring functions may have a graphical user interface. A standard network management unit is used as infrastructure. The administration unit 80 manages the definition and update of the user profiles database 64, and produces billing reports of each user transaction message or call. The network management unit 82 maintains and updates the global network topology of service nodes and their profiles, as well as dealing with network security issues. The service management unit 84 controls the activation and deactivation of new services and the modification of service definitions. The service creation tool 86 is a software package for modifying the call flow of services.

Fig. 8B shows an alternate arrangement of the components of the service node 30, according to a preferred embodiment of the present invention. The service node 30 comprises the SS7 interface 42, a capture device 90, a database 92, an application unit 94, a voice node 96 and the network management server 66. The service node 30 may also include the SMSC 22. The application unit 94 contains the logic of the service node 30 and controls its operation. The voice node 96 is used to connect the service node 30 to voice lines.

In operation, the capture device 90 monitors and filters the output of a voice mail system connected to the service node 30. When the output contains a message waiting indication, the application unit 94 transfers the short message generated by the SMSC 22 via an IP network to the application unit 94' of another

service node 30′. The application unit 94′ transfers the short message to the SMSC 22′ of the service node 30′, and the SMSC 22′ sends the short message via the mobile network connected to the service node 30′ to a roaming mobile telephone.

It will be appreciated by persons skilled in the art that the present invention is not limited to voice mail services, rather it is applicable to all value added services whose signals or data can be transferred over a packet-switch network through a service node connected to a telephone network. Examples of such value added services include, but are not limited to:

a) e-mail calls, in which users receive e-mail as a call to the mobile telephone even while roaming;

b) wireless access to corporate Intranets and other data networks;

c) voice-based information and e-commerce services tailored to travelers in accordance with their home and visited countries and languages;

d) home dialing services while roaming; and

e) fax services, using a specific cellular number as the fax gateway.

It will be appreciated by persons skilled in the art that the present invention is not limited by what has been particularly shown and described herein above, rather the scope of the invention is defined by the claims that follow.

CLAIMS

What is claimed is:

1. A system for providing a roaming subscriber with access to services available in a first telephone network, said subscriber roaming in a second telephone network, the system comprising:

a packet-switch network connecting said first telephone network with said second telephone network,

wherein signals required for said services are transmitted between said first telephone network and said second telephone network via said packet-switch network.

2. A system according to claim 1, wherein said first telephone network is one of a group including: a mobile telephone network, a fixed telephone network, a Global System for Mobile communications (GSM) network, a Time Division Multiple Access (TDMA) network, a Code Division Multiple Access (CDMA) network, an IS-41 network, and a private branch exchange (PBX).

3. A system according to claim 1, wherein said second telephone network is one of a group including: a mobile telephone network, a fixed telephone network, a Global System for Mobile communications (GSM) network, a Time Division Multiple Access (TDMA) network, a Code Division Multiple Access (CDMA) network, an IS-41 network, and a private branch exchange (PBX).

4. A system according to claim 1, further comprising a passive System Signaling Number 7 (SS7) monitor for monitoring SS7 signals and triggering

the provision of access to at least one of said services when one of a group of predetermined SS7 signals has been detected.

5. A system according to claim 4, wherein said predetermined SS7 signals are Mobile Application Part (MAP) messages.

6. A system according to claim 5, wherein said messages are from a group including: short messages and location updates.

7. A system according to claim 1, further comprising:

a first service node for transmitting said signals between said first telephone network and said packet-switch network; and

a second service node for transmitting said signals between said packet-switch network and said second telephone network.

8. A system according to claim 7, wherein said second service node transmits dial tone multi-frequency (DTMF) signals concurrently with the creation of a voice path connecting said first telephone network with said second telephone network, and said first service node synchronizes said DTMF signals with said voice path.

9. A system according to claim 7, wherein said subscriber uses a short code dependent upon the location of said subscriber to access said second service node.

10. A system according to claim 7, wherein said first service node instructs said second service node via said packet-switch network to generate and send a short message.

11. A system according to claim 7, further comprising:

a user profile of said subscriber, said user profile comprising at least a subscriber calling line identification (CLI),

wherein said subscriber CLI is required for access to said services.

12. A system according to claim 11, wherein said second service node receives said subscriber CLI from DTMF signals sent by said subscriber.

13. A system according to claim 11, wherein said second service node receives a second CLI from said second telephone network and said second CLI is associated with said subscriber CLI.

14. A system according to claim 11, wherein said second service node creates a voice path connecting said second telephone network with said first telephone network using a second CLI of said second service node, and wherein said first service node replaces said second CLI with said subscriber CLI when accessing one of said services.

15. A system according to any of claims 1 – 14, wherein said services include voice message notification.

16. A system according to any of claims 1 – 14, wherein said services include voice message retrieval.

17. A method for providing a roaming subscriber with access to services available in a first telephone network, the method comprising the steps of:

connecting said first telephone network to a second telephone network using a packet-switch network, said subscriber roaming in said second telephone network; and

transmitting signals for said services over said packet-switch network.

18. A method according to claim 17, wherein said first telephone network is one of a group including: a mobile telephone network, a fixed telephone network, a Global System for Mobile communications (GSM) network, a Time Division Multiple Access (TDMA) network, a Code Division Multiple Access (CDMA) network, an IS-41 network, and a private branch exchange (PBX).

19. A method according to claim 17, wherein said second telephone network is one of a group including: a mobile telephone network, a fixed telephone network, a Global System for Mobile communications (GSM) network, a Time Division Multiple Access (TDMA) network, a Code Division Multiple Access (CDMA) network, an IS-41 network, and a private branch exchange (PBX).

20. A method according to claim 17, further comprising the steps of:

monitoring SS7 signals; and

upon detection of one of a group of predetermined SS7 signals, triggering the provision of access to at least one of said services.

21. A method according to claim 20, wherein said predetermined SS7 signals are Mobile Application Part (MAP) messages.

22. A method according to claim 21, wherein said messages are from a group including: short messages and location updates.

23. A method according to claim 17, further comprising the steps of:

transferring dial tone multi-frequency (DTMF) signals over said packet-switch network;

concurrently with said step of transferring, creating a voice path connecting said first telephone network with said second telephone network; and

synchronizing said DTMF signals with said voice path.

24. A method according to claim 17, further comprising the step of:

using a short code dependent upon the location of said subscriber to access one of said services.

25. A method according to claim 17, further comprising the step of:

accessing said services using a subscriber calling line identification (CLI) stored in a user profile of said subscriber.

26. A method according to claim 25, further comprising the step of receiving said subscriber CLI from DTMF signals sent by said subscriber.

27. A method according to claim 25, further comprising the step of receiving a second CLI from said second telephone network, wherein said second CLI is associated with said subscriber CLI.

28. A method according to claim 25, further comprising the steps of:

creating a voice path connecting said second telephone network with said first telephone network using a second CLI; and

replacing said second CLI with said subscriber CLI when accessing one of said services.

29. A method according to any of claims 17 – 28, wherein said services include voice message notification.

30. A method according to any of claims 17 – 28, wherein said services include voice message retrieval.

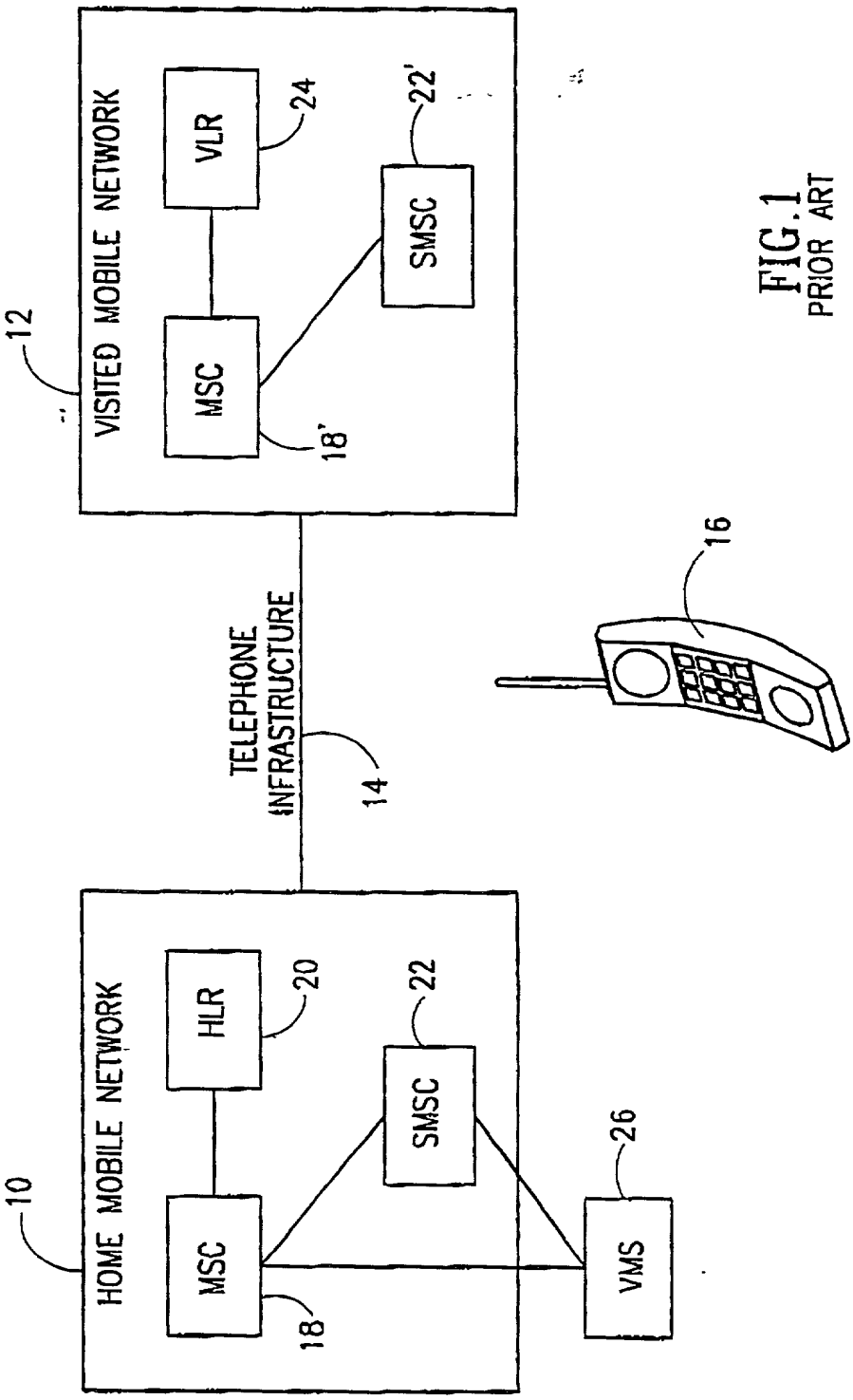


FIG.1
PRIOR ART

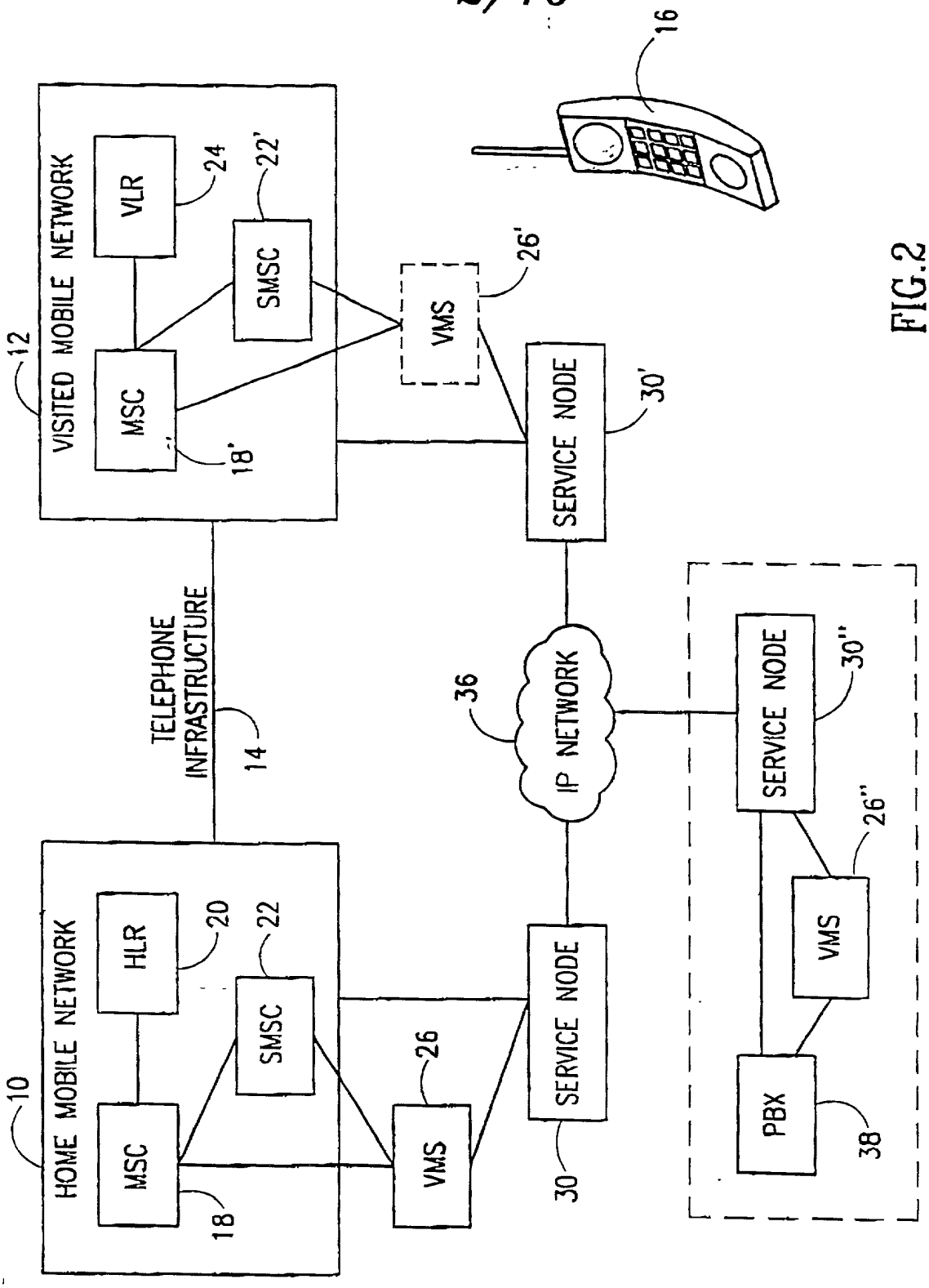

16
VISITED MOBILE NETWORK
12
VLR
24
SMSC
22'
MSC
18'
VMS
26'
SERVICE NODE
30'
TELEPHONE INFRASTRUCTURE
14
36
IP NETWORK
SERVICE NODE
30''
VMS
26''
PBX
38
HOME MOBILE NETWORK
10
HLR
20
SMSC
22
MSC
18
VMS
26
SERVICE NODE
30

FIG.2

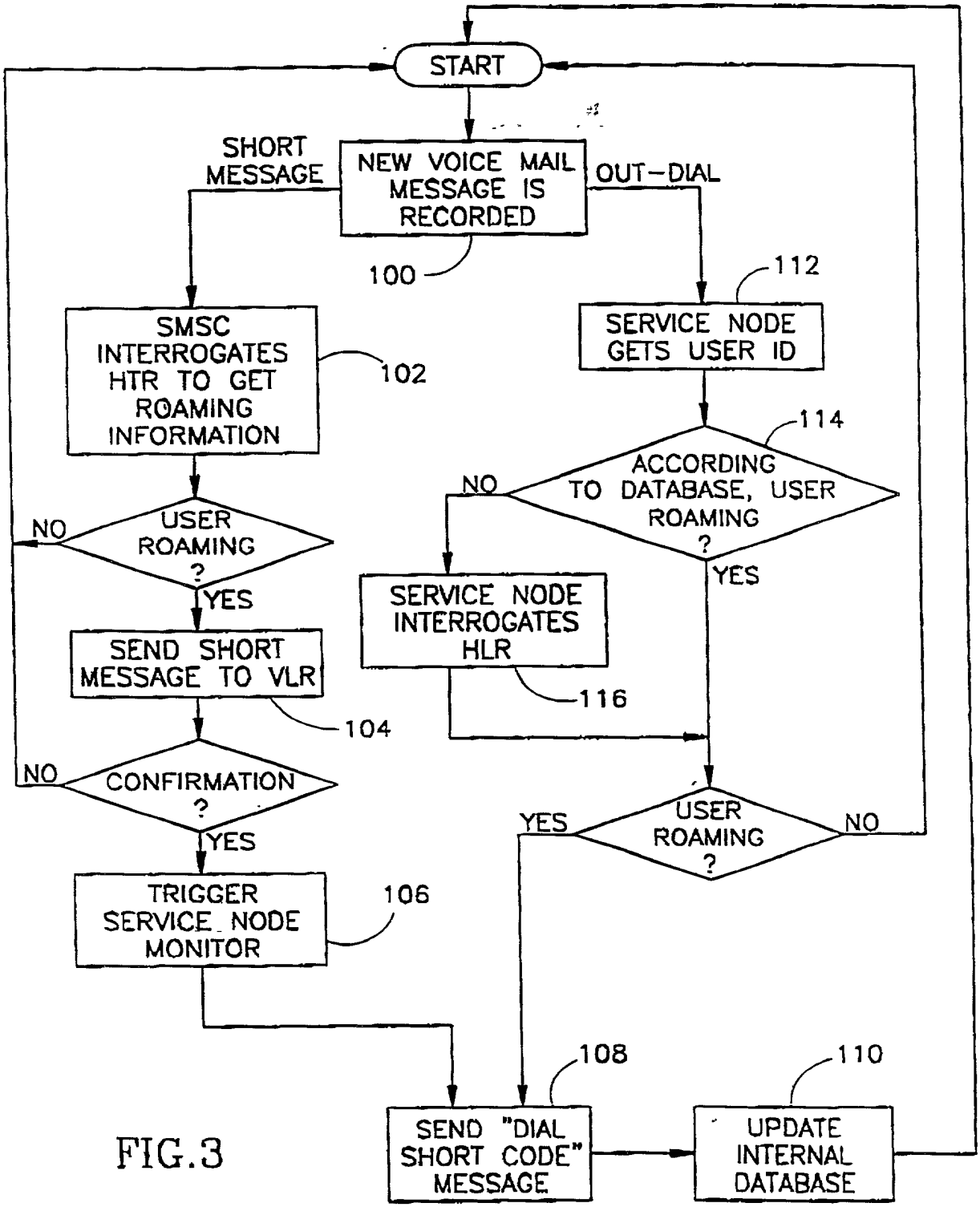

START
NEW VOICE MAIL MESSAGE IS RECORDED
100
SHORT MESSAGE
OUT-DIAL
SMSC INTERROGATES HTR TO GET ROAMING INFORMATION
102
USER ROAMING ?
NO
YES
SEND SHORT MESSAGE TO VLR
104
CONFIRMATION ?
NO
YES
TRIGGER SERVICE NODE MONITOR
106
SERVICE NODE GETS USER ID
112
ACCORDING TO DATABASE, USER ROAMING ?
114
NO
YES
SERVICE NODE INTERROGATES HLR
116
USER ROAMING ?
YES
NO
SEND "DIAL SHORT CODE" MESSAGE
108
UPDATE INTERNAL DATABASE
110

FIG.3

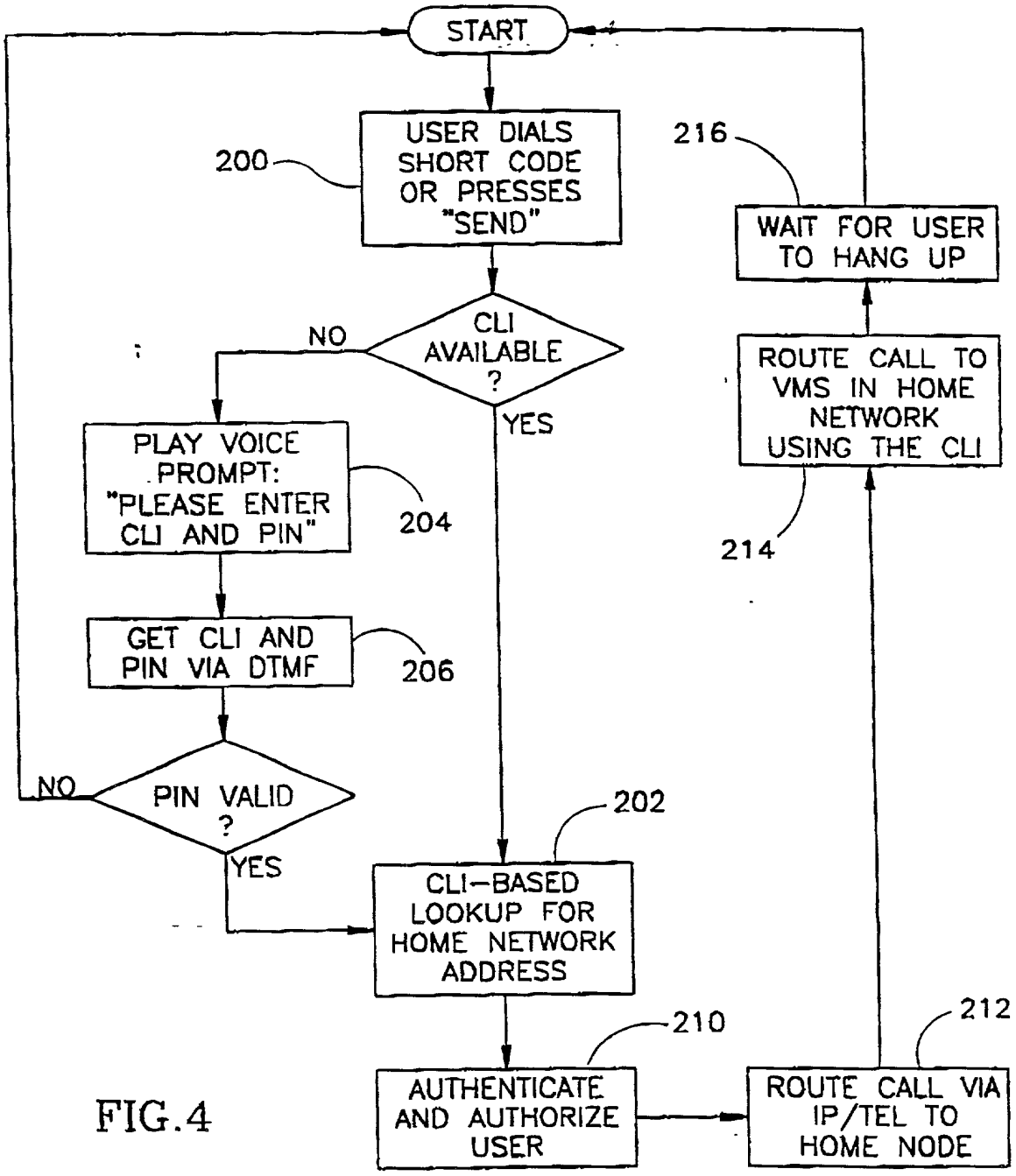

START
USER DIALS SHORT CODE OR PRESSES "SEND"
200
CLI AVAILABLE ?
NO
YES
PLAY VOICE PROMPT: "PLEASE ENTER CLI AND PIN"
204
GET CLI AND PIN VIA DTMF
206
PIN VALID ?
NO
YES
CLI-BASED LOOKUP FOR HOME NETWORK ADDRESS
202
AUTHENTICATE AND AUTHORIZE USER
210
ROUTE CALL VIA IP/TEL TO HOME NODE
212
ROUTE CALL TO VMS IN HOME NETWORK USING THE CLI
214
WAIT FOR USER TO HANG UP
216

FIG.4

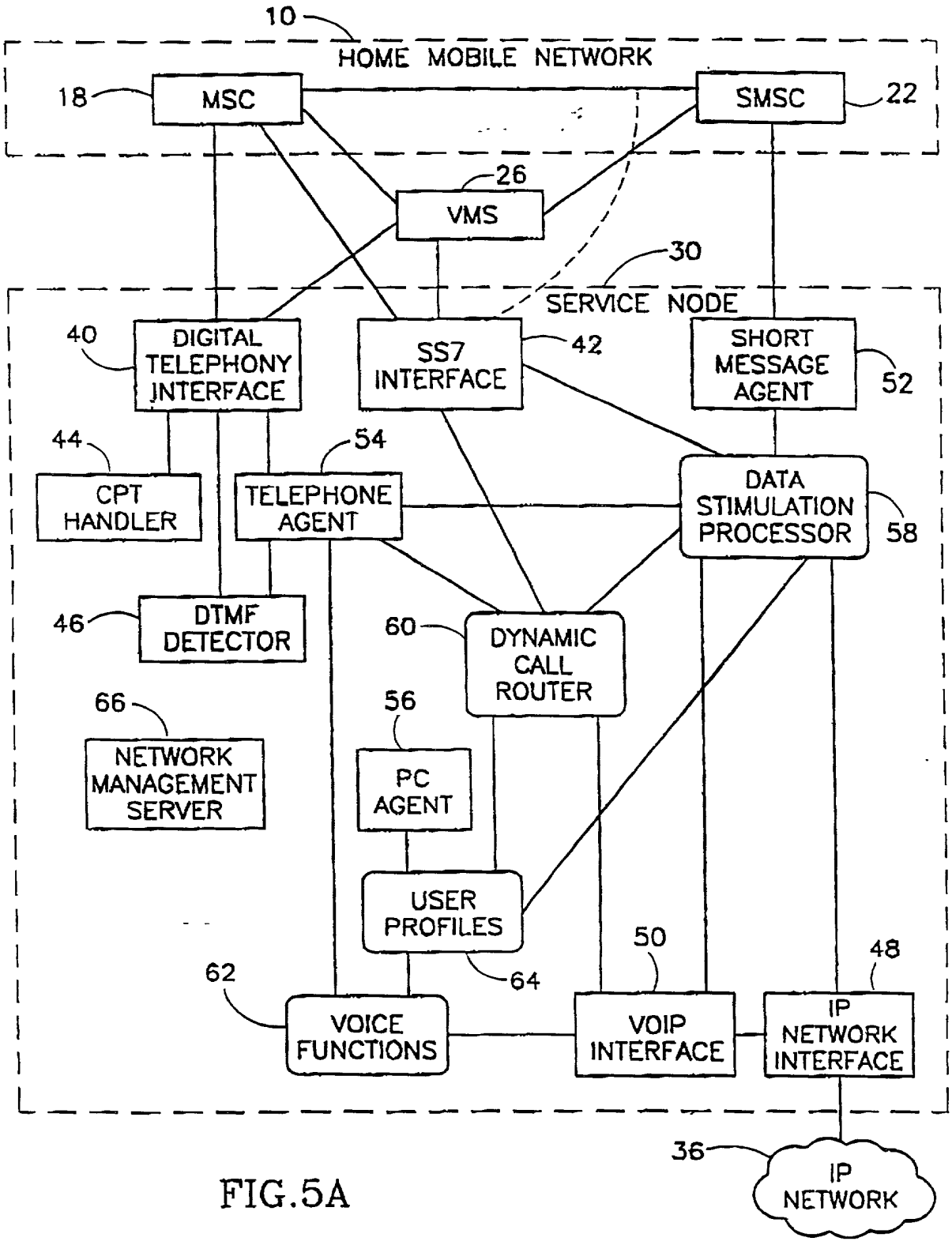

10
HOME MOBILE NETWORK
18
MSC
SMSC
22
26
VMS
30
SERVICE NODE
40
DIGITAL TELEPHONY INTERFACE
SS7 INTERFACE
42
SHORT MESSAGE AGENT
52
44
CPT HANDLER
54
TELEPHONE AGENT
DATA STIMULATION PROCESSOR
58
46
DTMF DETECTOR
60
DYNAMIC CALL ROUTER
66
NETWORK MANAGEMENT SERVER
56
PC AGENT
USER PROFILES
50
48
62
64
VOICE FUNCTIONS
VOIP INTERFACE
IP NETWORK INTERFACE
36
IP NETWORK

FIG.5A

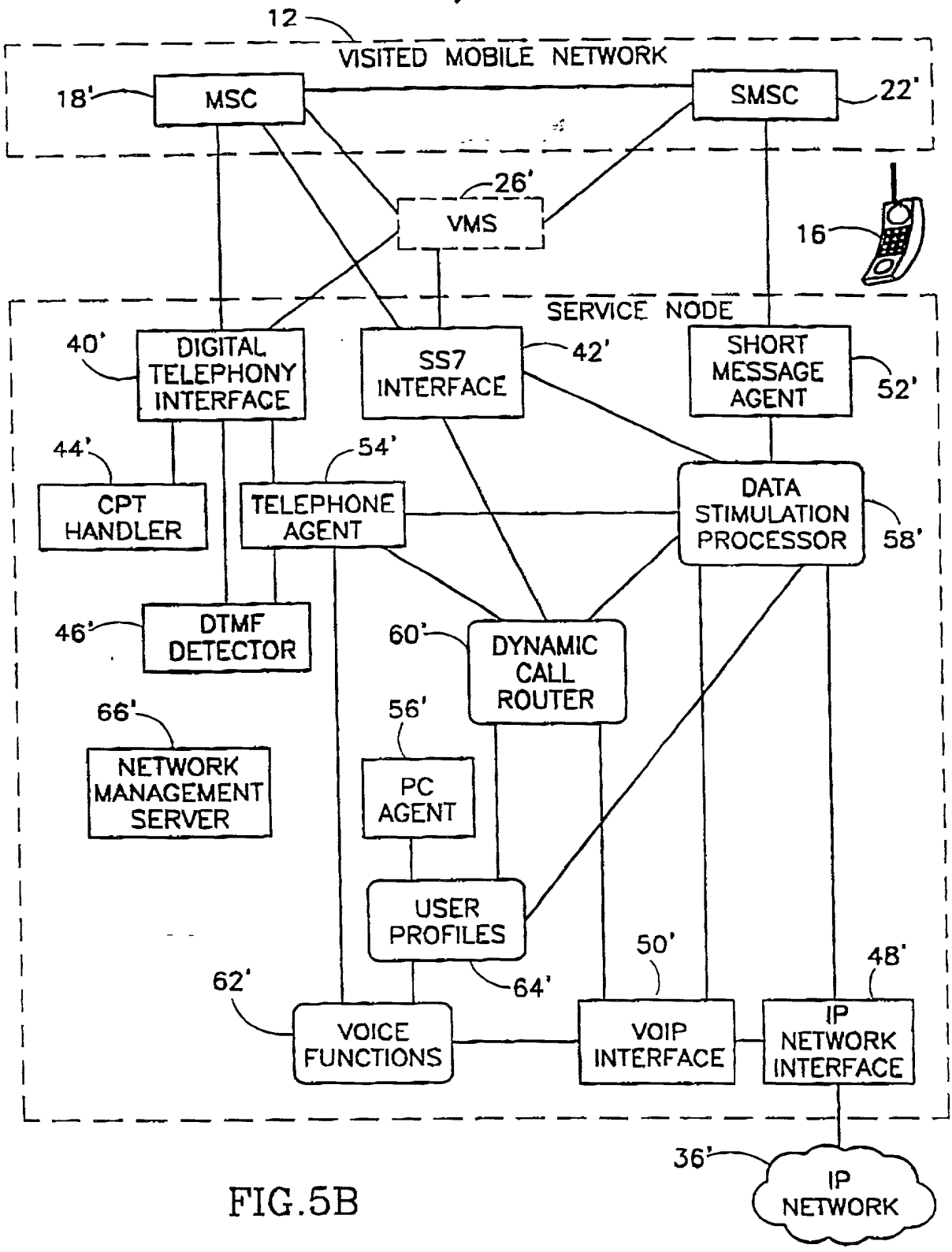

12
VISITED MOBILE NETWORK
18'
MSC
SMSC
22'
26'
VMS
16
SERVICE NODE
40'
DIGITAL TELEPHONY INTERFACE
SS7 INTERFACE
42'
SHORT MESSAGE AGENT
52'
44'
CPT HANDLER
54'
TELEPHONE AGENT
DATA STIMULATION PROCESSOR
58'
46'
DTMF DETECTOR
60'
DYNAMIC CALL ROUTER
66'
NETWORK MANAGEMENT SERVER
56'
PC AGENT
USER PROFILES
50'
48'
62'
64'
VOICE FUNCTIONS
VOIP INTERFACE
IP NETWORK INTERFACE
36'
IP NETWORK

FIG.5B

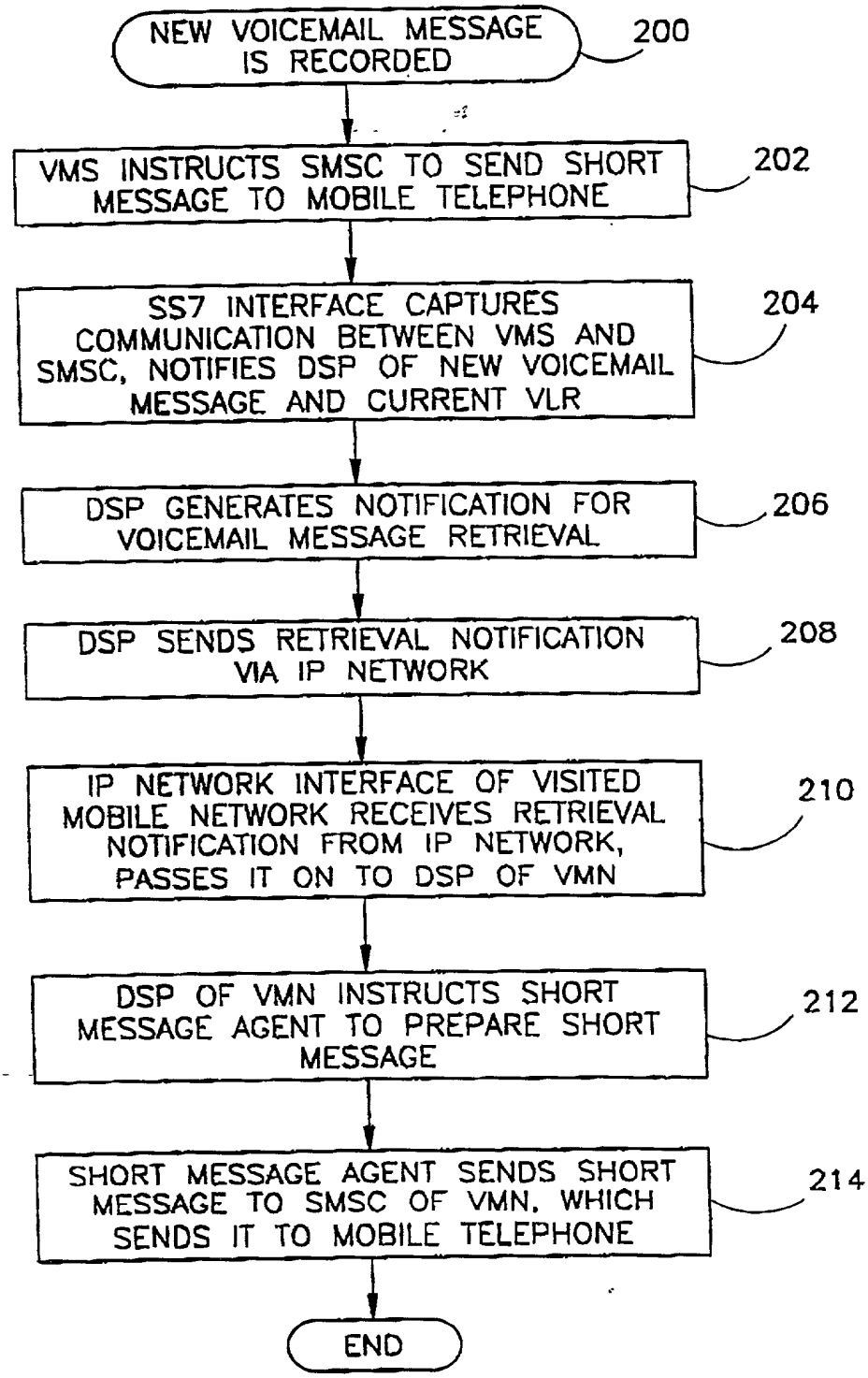

NEW VOICEMAIL MESSAGE IS RECORDED
200
VMS INSTRUCTS SMSC TO SEND SHORT MESSAGE TO MOBILE TELEPHONE
202
SS7 INTERFACE CAPTURES COMMUNICATION BETWEEN VMS AND SMSC, NOTIFIES DSP OF NEW VOICEMAIL MESSAGE AND CURRENT VLR
204
DSP GENERATES NOTIFICATION FOR VOICEMAIL MESSAGE RETRIEVAL
206
DSP SENDS RETRIEVAL NOTIFICATION VIA IP NETWORK
208
IP NETWORK INTERFACE OF VISITED MOBILE NETWORK RECEIVES RETRIEVAL NOTIFICATION FROM IP NETWORK, PASSES IT ON TO DSP OF VMN
210
DSP OF VMN INSTRUCTS SHORT MESSAGE AGENT TO PREPARE SHORT MESSAGE
212
SHORT MESSAGE AGENT SENDS SHORT MESSAGE TO SMSC OF VMN, WHICH SENDS IT TO MOBILE TELEPHONE
214
END

FIG.6

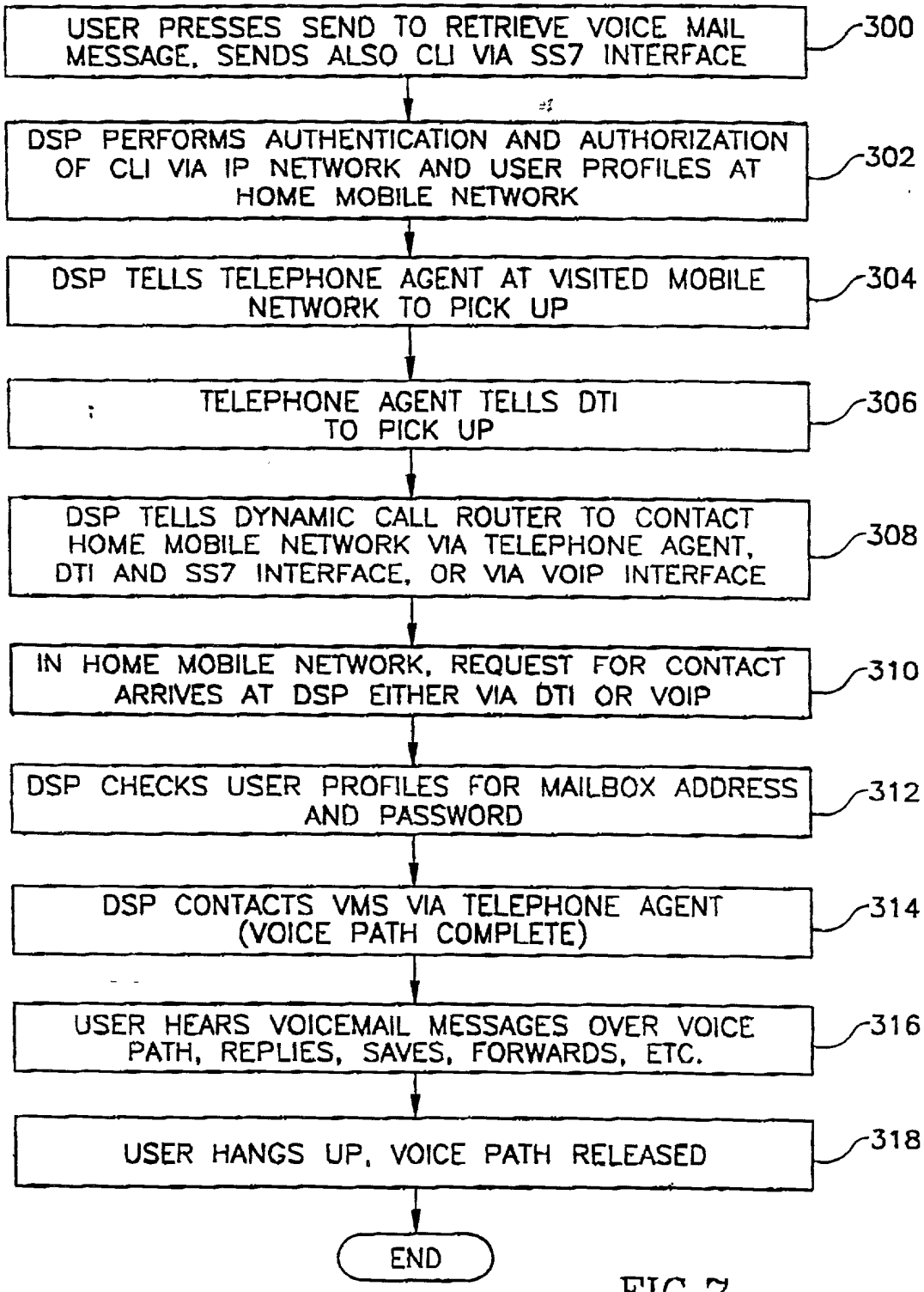

USER PRESSES SEND TO RETRIEVE VOICE MAIL MESSAGE. SENDS ALSO CLI VIA SS7 INTERFACE
300
DSP PERFORMS AUTHENTICATION AND AUTHORIZATION OF CLI VIA IP NETWORK AND USER PROFILES AT HOME MOBILE NETWORK
302
DSP TELLS TELEPHONE AGENT AT VISITED MOBILE NETWORK TO PICK UP
304
TELEPHONE AGENT TELLS DTI TO PICK UP
306
DSP TELLS DYNAMIC CALL ROUTER TO CONTACT HOME MOBILE NETWORK VIA TELEPHONE AGENT, DTI AND SS7 INTERFACE, OR VIA VOIP INTERFACE
308
IN HOME MOBILE NETWORK, REQUEST FOR CONTACT ARRIVES AT DSP EITHER VIA DTI OR VOIP
310
DSP CHECKS USER PROFILES FOR MAILBOX ADDRESS AND PASSWORD
312
DSP CONTACTS VMS VIA TELEPHONE AGENT (VOICE PATH COMPLETE)
314
USER HEARS VOICEMAIL MESSAGES OVER VOICE PATH, REPLIES, SAVES, FORWARDS, ETC.
316
USER HANGS UP, VOICE PATH RELEASED
318
END

FIG.7

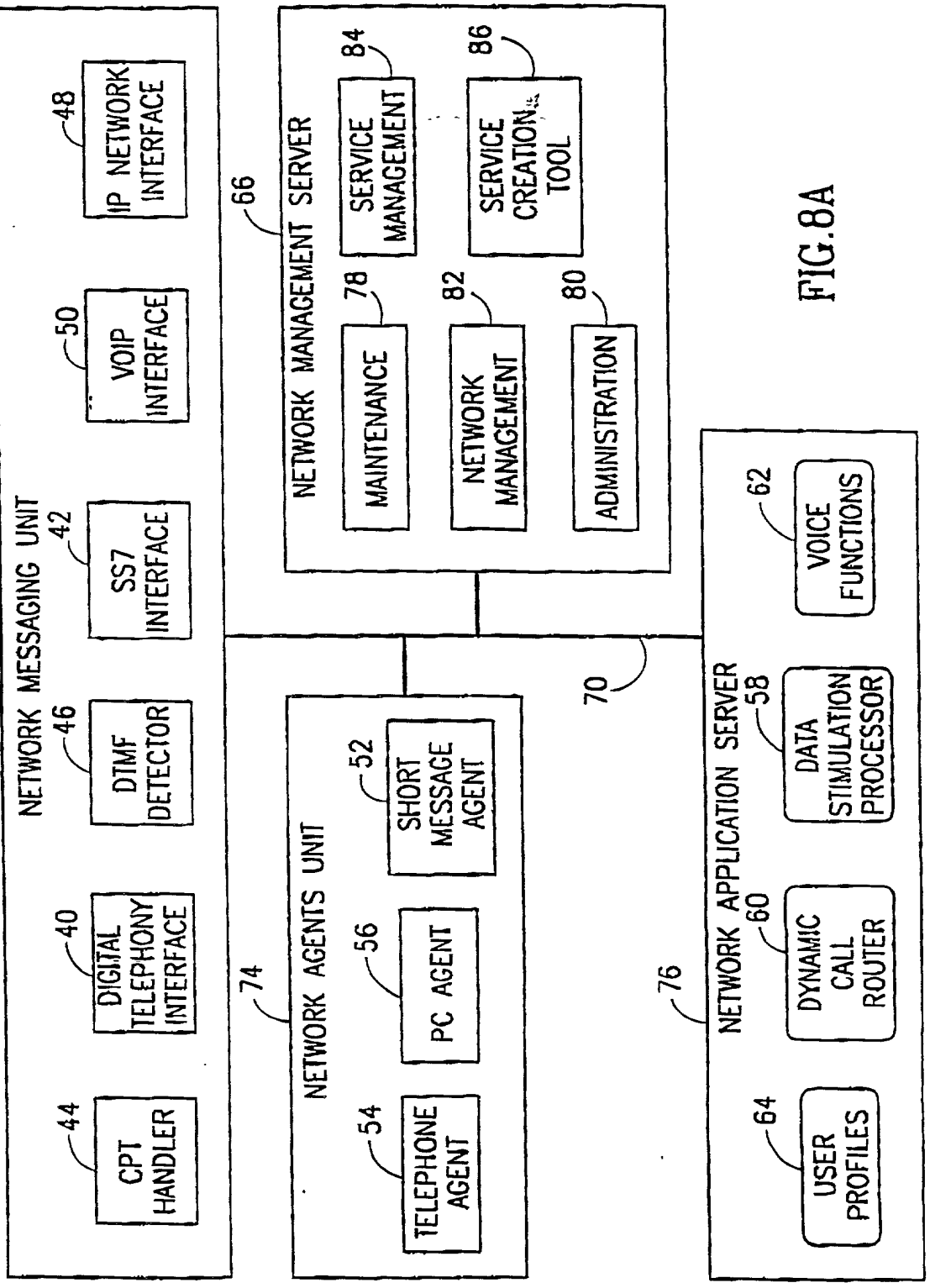
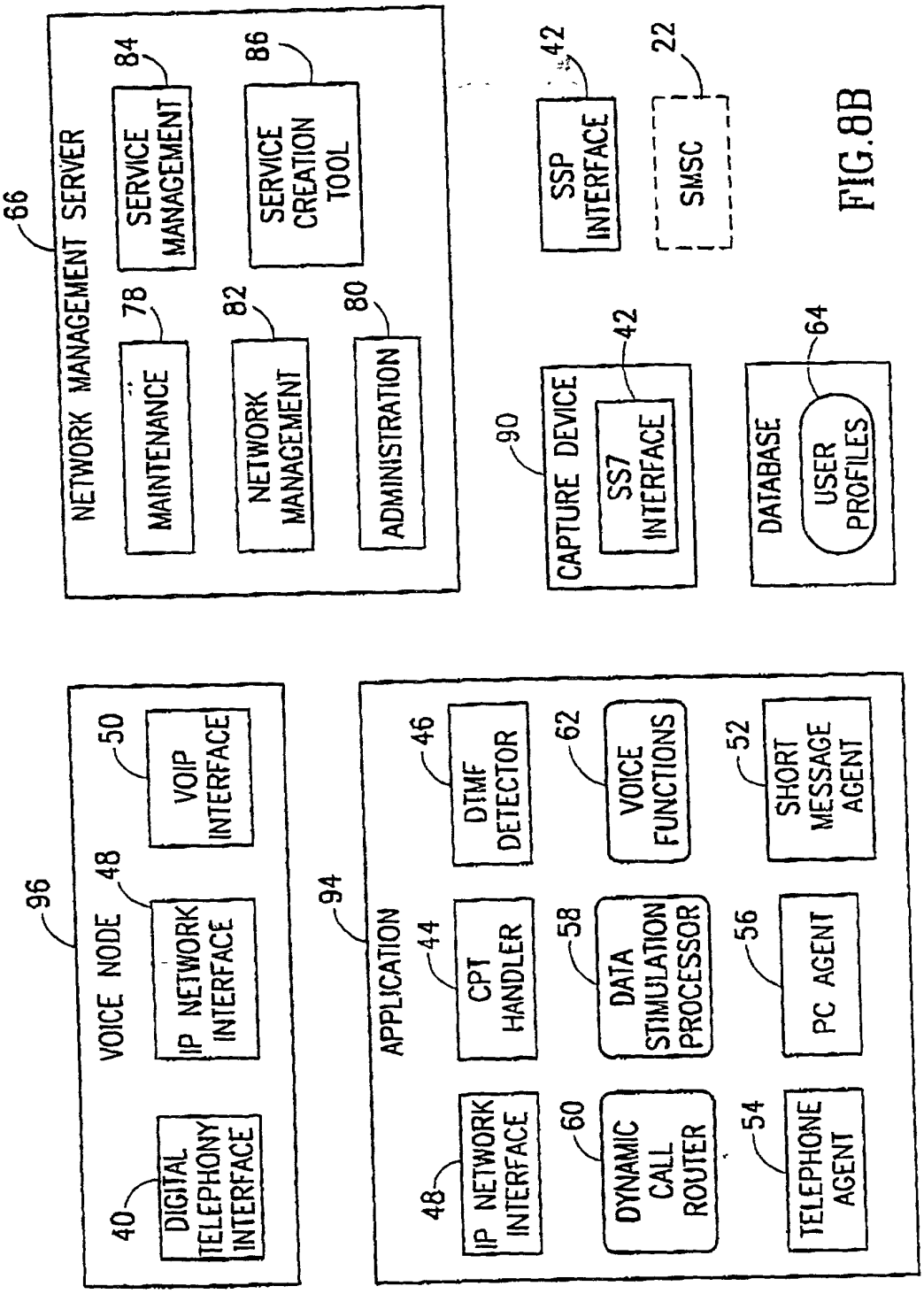

NETWORK MESSAGING UNIT
72
CPT HANDLER
44
DIGITAL TELEPHONY INTERFACE
40
DTMF DETECTOR
46
SS7 INTERFACE
42
VOIP INTERFACE
50
IP NETWORK INTERFACE
48
NETWORK AGENTS UNIT
74
TELEPHONE AGENT
54
PC AGENT
56
SHORT MESSAGE AGENT
52
NETWORK MANAGEMENT SERVER
66
MAINTENANCE
78
NETWORK MANAGEMENT
82
ADMINISTRATION
80
SERVICE MANAGEMENT
84
SERVICE CREATION TOOL
86
70
NETWORK APPLICATION SERVER
76
USER PROFILES
64
DYNAMIC CALL ROUTER
60
DATA STIMULATION PROCESSOR
58
VOICE FUNCTIONS
62

FIG.8A


NETWORK MANAGEMENT SERVER
66
MAINTENANCE
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ADMINISTRATION
80
SERVICE MANAGEMENT
84
SERVICE CREATION TOOL
86
SSP INTERFACE
42
SMSC
22
CAPTURE DEVICE
90
SS7 INTERFACE
42
DATABASE
64
USER PROFILES
VOICE NODE
96
DIGITAL TELEPHONY INTERFACE
40
IP NETWORK INTERFACE
48
VOIP INTERFACE
50
APPLICATION
94
IP NETWORK INTERFACE
48
CPT HANDLER
44
DYNAMIC CALL ROUTER
60
DATA STIMULATION PROCESSOR
58
TELEPHONE AGENT
54
PC AGENT
56
DTMF DETECTOR
46
VOICE FUNCTIONS
62
SHORT MESSAGE AGENT
52

FIG.8B

Attorney Docket No.: **P-1660-US**

DECLARATION AND POWER OF ATTORNEY FOR PATENT APPLICATION

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below under my name.

I believe that I am the original, first and sole inventor of the subject matter which is claimed and for which a patent is sought on the invention entitled

SYSTEM AND METHOD FOR PROVIDING ACCESS TO VALUE ADDED SERVICES FOR ROAMING USERS OF MOBILE TELEPHONES

the Specification of which

☐ is attached hereto
☒ was filed on **May 5, 1999**
as United States Application Number or PCT International Application No. **PCT/IL99/00235**
and was amended on **November 2, 2000** (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified Specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, 1.56(a).

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any provisional application filed in the United States in accordance with 35 U.S.C. §1.119(e), or any application for patent that has been converted to a Provisional Application within one (1) year of its filing date, or any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed.

PRIOR FILED APPLICATION(S)

APPLICATION NUMBER	COUNTRY	(DAY/MONTH/YEAR FILED)	PRIORITY CLAIMED
60/084,359	**US**	**5-May-98**	**YES**
PCT/IL99/00235	**PCT**	**5-May-99**	**YES**

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application listed below, and, insofar as the subject matter of each of the claims of this application is not disclosed in any prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a), which occurred

between the filing date of the prior application and the national or PCT international filing date of this application:

APPLICATION NO.	FILING DATE (DAY/MONTH/YEAR)	STATUS - PATENTED, PENDING, ABANDONED
60/084,359	5-May-98	EXPIRED
PCT/IL99/00235	5-May-99	

I hereby appoint as my attorney(s) and agent(s) Heidi M. Brun (Agent, Registration No. 35,104), or Jerome R. Smith, Jr. (Attorney, Registration No. 35,684), or Daniel J. Swirsky (Agent, Registration No. 45, 148) or Mark S. Cohen (Attorney, Registration No. 42, 425) or Rochel L. Abboudi (Agent, Registration No. 44,490) or Suzanne Erez (Agent, Registration No. 46,688) said attorney(s) and agent(s) with full power of substitution and revocation to prosecute this application and transact all business in the Patent and Trademark Office connected therewith.

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ARLINGTON, VA 22202-3709

Direct all telephone calls to (703) 486-0600 and all facsimiles at (703) 486-0800.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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SIGNATURE OF INVENTOR _____

DATE 20/12/00

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SIGNATURE OF INVENTOR _____

DATE 31/12/00